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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/715,757

11/18/2003

William Robert Licht

2443.004US1

5267

21186

7590

02/26/2008

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EXAMINER

MERKLING, MATTHEW J

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

02/26/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/715,757	Applicant(s) LICHT ET AL.	
	Examiner MATTHEW J. MERKLING	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/26/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Warnings

1. Applicant is advised that should claims 1-9 be found allowable, claims 28-36 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 9, 10, 18, 19, 27, 28 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Lenglet et al. (US 2002/0106538).

Regarding claims 1, 10, 19 and 28, Lenglet discloses a process and apparatus for the exothermic generation of syngas by the partial oxidation (paragraph [0015]) of a hydrocarbon-containing fuel comprising:

(i) reacting the hydrocarbon-containing fuel with an oxygen containing gas in a first reactor (3) to produce the syngas and byproducts comprising CO₂, H₂O and soot (paragraphs [0004], [0022]); and

(ii) introducing the syngas and byproducts into a second reactor (filter, 7, 14, see flow diagram of Fig. 1) containing a non-carbonaceous material (ceramic, paragraph [0027]) that traps the soot for a sufficient time such that the majority of the byproduct soot is gasified (paragraph [0041]) via reaction with the byproduct CO₂ (from gasification of soot) to produce a syngas stream that is depleted in the soot (see abstract).

Regarding claims 9, 18, 27 and 36, Lenglet further discloses a fluid (via valve (21)) added to the syngas and byproducts (see flow diagram of Fig. 1) produced by the first reactor prior to introducing the syngas and byproducts into the second reactor.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1795

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1, 3, 6, 7, 10, 12, 15, 16, 19, 21, 24, 25, 28, 30, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edlund et al. (US 2001/0045061) in view of Adiletta (US 2002/0141910).

Regarding claims 1, 3, 7, 10, 12, 16, 19, 21, 25, 28, 30 and 34, Edlund discloses a process and apparatus for partial oxidation for the production of hydrogen and carbon monoxide, or syngas (paragraph [0020]) from hydrocarbon containing fuel (see abstract) comprising:

(i) reacting the hydrocarbon-containing fuel (stream 16) with an oxygen containing gas (partial oxidation, paragraph [0020]) in a first reactor (32) to produce the syngas (hydrogen rich stream) and byproducts comprising CO₂, H₂O (inherent from partial oxidation of hydrocarbon feed) and soot (particulates, see abstract); and

(ii) introducing the syngas and byproducts (via conduit 36) into a second vessel (filter, 60) containing a non-carbonaceous material (sintered metal, ceramic, paragraph [0043]).

Art Unit: 1795

Edlund fails to explicitly disclose the soot gasified "in situ" with the byproducts of the partial oxidation. Edlund teaches a filter to be cleaned or regenerated by removal of the filter (paragraph [0060]).

Adiletta discloses an oxidation process with a filter (diesel exhaust filter) downstream from a combustion zone (engine), similar to the process flow of Edlund. Adiletta teaches the diesel particulate filter operates in such a way that traps the majority of the soot (particulates, see abstract) and oxidizes them, in situ, in the presence of a catalyst (paragraph [0021]) and byproduct gases. Adiletta teaches this in-situ process as a way of regenerating said filter during operation and eliminating the need to remove the filter for regeneration (paragraph [0113]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the in situ regeneration process along with catalyst on the filter, as in Adiletta, in the process of Edlund in order to trap soot on the filter and efficiently oxide said soot in order to eliminate the need to remove the filter for regeneration.

Regarding claims 6, 15, 24 and 33, Edlund, as discussed in claims 1, 10, 19 and 28 above further discloses the non carbonaceous material contained in the second reactor (filter) is in the form of rings (discs, paragraph [0043]).

7. Claims 2, 11, 20 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edlund et al. (US 2001/0045061) and Adiletta (US 2002/0141910) as

Art Unit: 1795

applied to claims 1, 10, 19 and 28 above, and further evidenced by Clawson et al. (US 6,641,625).

Regarding claims 2, 11, 20 and 29, Edlund, as discussed in claims 1, 10, 19 and 28 above, further discloses recovering a portion of the heat from the soot depleted syngas stream partial oxidation and using at least a portion of the recovered heat to facilitate the additional production of syngas via catalytic reforming of natural gas and steam (paragraph [0020]), which is known in the art as autothermal reforming (see Clawson col. 3 lines 53-62).

8. Claims 8, 17, 26 and 35 rejected under 35 U.S.C. 103(a) as being unpatentable over Lenglet et al. (US 2002/0106538) as applied to claims 1, 10, 19 and 28 above.

Regarding claims 8, 17, 26 and 35, Lenglet, as discussed in claims 1, 10, 19 and 28 above, discloses that the first reactor (3) is operated at a temperature of 1460°C (2600°F) and the second reactor (7) is operated at a temperature between 200°C (392°F) and 1050°C (2100°F) (see claim 1(e)). While Lenglet doesn't explicitly disclose a temperature of the second reactor between 2100°F and 2800°F, process variables (i.e. temperature) are considered results effective variables and are not considered to confer patentability to the claim. As such, without showing unexpected results, the claimed process variables (i.e. temperature) cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the temperature to obtain the desired results (In re Boesch, 617 F. 2d. 272,205 USPQ 215 (CCPA 1980)). Since it has been held that where general

Art Unit: 1795

conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

9. Claims 4, 5 13, 14, 22, 23, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lenglet et al. (US 2002/0106538) as applied to claims 1, 10, 19 and 28 above, and further in view of Michalko (US 3,714,071).

Regarding claim 4, 5 13, 14, 22, 23, 31 and 32 Lenglet as discussed in claims 1, 10, 19 and 28 above, teaches the non-carbonaceous material as ceramic combustion catalyst support for the combustion (high temperature) of hydrocarbons (paragraphs [0050] and [0054]) but does not explicitly disclose spherical alumina (a variety of ceramic) as the non-carbonaceous material.

Michalko also discloses a method and apparatus for treating combustion byproducts by oxidation/combustion of hydrocarbons (col. 1 lines 11-20). Michalko teaches low-density alumina spheres/catalyst support (see abstract) that are utilized in an internal combustion engine to further oxidize/combust byproducts of the incomplete combustion of a fuel (col. 1 lines 3-30). Michalko teaches this as a preferable way of improving the strength of the oxidation/combustion catalyst at high temperatures (see abstract and title).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the low density alumina spheres of Michalko in the 2nd reactor of Lenglet as a preferable way of oxidizing the incomplete combustion byproducts (soot) with a catalyst and catalyst support of high strength at high temperatures.

Response to Arguments

10. Applicant's arguments, see page 8, paragraph 2, filed 12/26/07, with respect to the rejection of claims 1, 10, 19 and 28 under 35 USC § 102 have been fully considered and are persuasive. The rejection of 9/24/07 has been withdrawn.

Specifically, Applicant argued that Abdelmalek combusted the collected char via an external source of oxygen, rather than with byproduct CO₂ and/or H₂O, as presented in the claim. The examiner finds this argument persuasive.

11. Applicant's arguments filed 12/26/07 regarding the rejections in view of Lenglet and Edlund have been fully considered but they are not persuasive.

First, Applicant argues that the soot in the process of Lenglet is combusted with externally supplied oxygen rather than byproduct CO₂ and/or H₂O (see page 9, paragraph 1). The examiner respectfully disagrees.

Lenglet discloses gasifying the trapped soot with exhaust from the first reactor (3) by stating in paragraph 29 that "the second circuit of the recovery zone can contain at least one filter. It can contain a catalyst for vapor reforming recovered soot to gasify it while the first filter is in a regeneration mode". In other words, Lenglet implies that soot is further gasified in the filter while the other filter is being regenerated (which means exhaust from the first reactor must be traveling to the online filter).

Second, Applicant argues that the Adiletta reference nowhere discusses the production of syngas from the reaction of the particulate matter with byproduct CO₂

Art Unit: 1795

and/or H₂O (see page 10, paragraph 1), and therefore the modified Edlund does not disclose the claimed subject matter. The examiner respectfully disagrees.

The modification of Edlund with Adiletta was for the purpose of providing a means for "online regeneration" where the filter of Edlund would not have to be removed. Adiletta teaches a method of regenerating a filter, filled with soot/particulates, with the exhaust gases from the reactor that emitted the soot/particulates. Edlund was not modified with Adiletta for the purpose of syn-gas production, as Applicant implies in the argument cited above, but only for the purposes of filter regeneration.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1795

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795